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# Controlled Motor Pump Using Arduino

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## ABSTRACT:

### A. Build System Relay :

We create connections to the solid state relays, Arduino and small fountain pump system, Arduino allows the pump open or close automatically. A striped cut through the inner tube of the pump segment insulated wire, only half. Install the new cut wire, there are two output relays at both ends. We put on the bare electrical tape. Finally, the ground relay is connected to the Arduino ground and relay input to the Arduino digital pins.

### B. Build up System Reservoir:

Submerged pump supplies a desired amount of water needed by the plant in order to work properly. Automate this process, we use a float valve, which you need to open whenever needed, close the connection when the water level rises and water hoses. Drilling is high enough to ensure that the float valve chamber, sufficient to accommodate the width of the tank float.

### C. Build System tubing and connect:

Connection to plastic lob feed pumps and drilling small holes through which water droplets. All of the trunk circuit.

### D. Code:

Automated plant watering system is programmed using Arduino IDE software. Arduino microcontroller checks soil moisture level, if low, triggering a water pump on until sensor reaches threshold. After this, the system will re-check the soil moisture between periodic intervals to see if you need International Journal of Engineering Research & Technology (IJERT) ISSN: 2278-0181 Published by, [www.ijert.org](http://www.ijert.org) NConPCS - 2017 Conference Proceedings Volume 5, Issue 18 Special Issue - 2017 3 more water. If the water in the initial inspection, no water or comment, the system waits 24 hours, and repeat the process.

## Powerrequirement:

- Arduino-5v
- Moisture sensor-3.3V
- 4channelrelay-5v
- powersupply-230
- Motor pump – 5v

## I. INTRODUCTION

We all know that plants are very beneficial to all human beings in many aspects. Plants helps in keeping the environment healthy by cleaning air naturally and producing oxygen. Many people love to have plants in their backyard. But due to civilization and insufficiency of place many people used to grow plants in a mild or dirt, pot, and placed on the windowsill. These plants are dependent on conventional breeding watering, and provide the right amount of sun to sustain life and growth. In busy schedule of day to day life, many time people forget to water their plants and due to these plants suffer many disorders and ultimately died. In addition, the world's biggest problem in modern society is the shortage of water resources agriculture is a demanding job to consume large amounts of water. It is very essential to utilize the water resources in proper way. Thus, a system is required, to handle this task automatically. Automated plant watering system estimate and measure the existing plant and then supplies desired amount of water needed by that plant. It is minimizing the excess water use as well as keeping plants healthy.

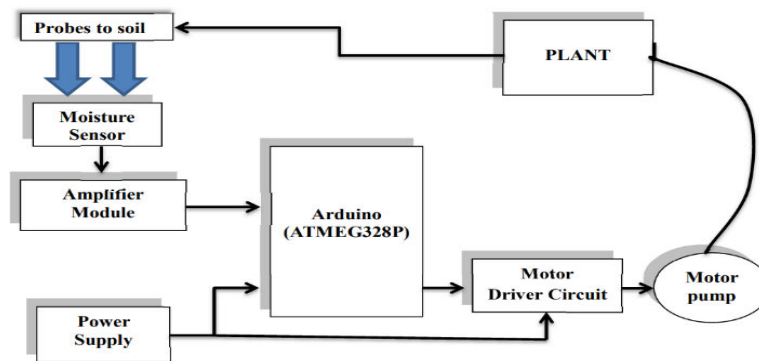
## II. PROBLEM STATEMENT

In the increasing agriculture activity in India ,there is no smart facility and assistant to make farmer and agriculture system developed .

## III .OBJECTIVES

There are two functional components in this paper. They are moisture sensor and motor / pump. Arduino board is programmed using the Arduino IDE software. Humidity sensor is used to detect the soil moisture content. Motor / pump are used to supply water to plants. Soil moisture is set particularly for specific plants requirement, and according to that system is being operated. Microcontroller (ATmega328) is the brain of the system. Both humidity and temperature sensor is connected to the controller's input pin. Pump and servo motor coupled to the output pin. In case of soil moisture value is less than threshold system automatically triggers water pump on till sensor meets threshold and then sets off automatically. The overall activity is reported to the user using mobile application.

## IV. BLOCK DIAGRAM



## V. SOFTWARE USED

- Arduino IDE

## VI.COMPONENTSUSED

- Arduino (ATMEGA328P)
- Moisture Sensor module
- Relay module
- Regulated Power Supply
- Motor pump
- Adpater

### A. Adriano uno:



Fig. Diagram of Arduino

The Arduino uno is an open-source microcontroller board based on the microchip atmega 328P microcontroller and developed by Arduino . The board is equipped with sets of digital and analog input/output (I/O) pins that may be interacted to various expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of pwm output). 6 analog I/O pins. And is programmable with the Arduino IDE (integrated development environment). Via a type b USB cable. It can be powered by the usb cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts.

#### Pinfunctions:

- **Led:** There is a built-in led driven by digital pin 13. When the pin is high value, the fed is on, when the pin is low, it is off.
- **Vin:** The input voltage to the Arduino board when it is using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). You can supply voltage through this pin, or, if supplying voltage via the power jack, access it through this pin.
- **5v:** This pin outputs a regulated 5v from the regulator on the board. The board can be supplied with power either from the dc power jack (7 - 20v), the usb connector (5v), or the VIN pin of the board (7-20v). Supplying voltage via the 5v or 3.3v pins bypasses the regulator, and can damage the board.
- **3v:** a 3.3 volt supply generated by the on-board regulator. Maximum current draw is 50 mas.
- **Gnd:** Ground pins.

#### B.SoilMoisture Sensor :

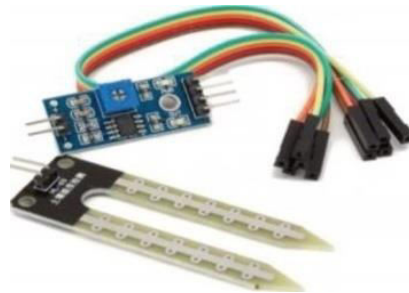


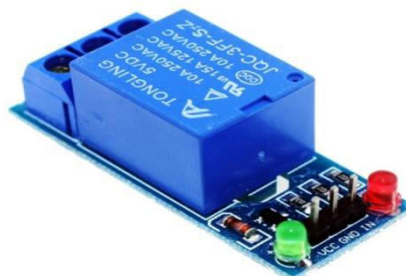
Fig. Moisture Sensor Module

Soil moisture sensor measure the volumetric water content in soil since the direct gravimetric measurement of free. Soil moisture requires removing drying and weighing of a sample, soil moisture sensors measure the volumetric water content indirectly by using some other property of the soil, such as electrical resistance, dielectric constant or interaction with neutrons as a proxy for the moisture content.

The relation between the measured property and soil moisture must be calibrated and may vary depending on environmental factors such as soil type, temperature, or electric conductivity reflected microwave radiation in attested by the soil moisture and is used for remote sensing in hydrology and agriculture portable probe instruments can be used by farmers .

Soil moisture sensors typically refer to sensors that estimate volumetric water content another class of sensors measure another property of moisture in sores call water polenta.

#### C. Relay Module:



.Fig.Relaymodule

The relay module with a single channel board is used to manage high voltage, current loads like solenoid valves, motor, AC load & lamps. This module is mainly designed to interface through different microcontrollers like PIC, Arduino, etc



Fig. Relay Module Pin Diagram

- **Normally Open (NO):**  
This pin is normally open unless we provide a signal to the relay modules signal pin. So, the common contact pin smashes its link through the NC pin to make a connection through the NO pin .
- **Common Contact:**  
This pin is used to connect through the load that we desire to switch by using the module.
- **Normally Closed (NC):**  
This NC pin is connected through the COM pin to form a closed circuit. However, this NC connection will break once the relay is switched through providing an active high/low signal toward the signal pin from a microcontroller.
- **Signal Pin:**  
The signal pin is mainly used for controlling the relay. This pin works in two cases like active low otherwise active high. So, in active low case, the relay activates once we provide an active low signal toward the signal pin, whereas, in an active high case, the relay will trigger once we provide a high signal toward the signal pin.

#### D. RegulatedPowerSupply:

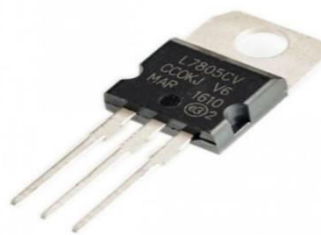
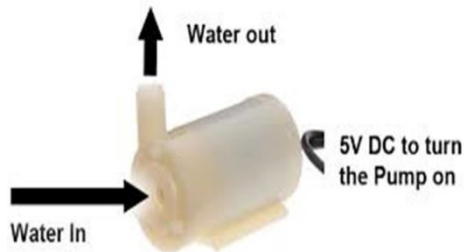


Fig. L7805CV

The LM7805 series of three terminal positive regulators are available in the TO-220 package and with several fixed output voltages, making them useful in a wide range of applications. Each type employs internal current limiting, thermal shut down and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output current. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.

### E. Motor Pump :



*Fig. Motor Pump.*

Water is used to perform a specific task of artificially pumping. It can be controlled by an electronic microcontroller. It can be on 1 triggered by sending the signal and turned off as needed. Artificial process is called Water Pumping Station. There are many varieties of pumps. This project uses a small pump connected to the H-bridge.

### F. Adapter :



*Fig. Adapter.*

Output 12 volts up to 2 amp. This DC power supply will, making this a great solution for longer runs that have a higher power consumption

## VIII. DESCRIPTION OF SOFTWARE

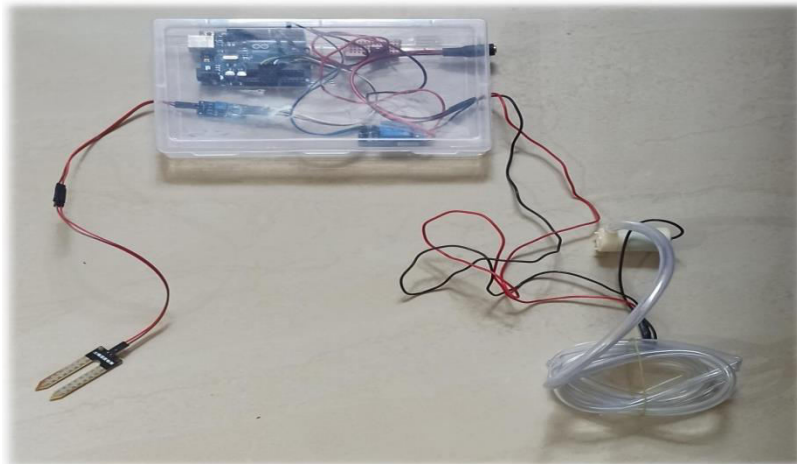
### Arduino IDE Code :

```
int water; //random variable
void setup()
{
pinMode(3,OUTPUT); //output pin for relay board, this will sent signal to the relay
pinMode(6,INPUT); //input pin coming from soil sensor
}
void loop ()
{
water = digitalRead(6); // reading the coming signal from the soil sensor
if(water == HIGH) // if water level is full then cut the relay
{
digitalWrite(3,LOW); // low is to cut the relay
}
else
{
digitalWrite(3,HIGH); //high to continue proving signal and water supply
}
delay(400);
}
```

## IX . RESULT

The project till start the motor only if the moisture sensor senses less humidity in the soil unless the motor will the off. Automated plant watering system estimate and measure the existing plant and then supplies desired amount of water needed by that plant. It is minimizing the excess water use as well as keeping plants healthy.

## X. EXPERIMENT SETUP



## XI. ADVNTAGES

- Can save water
- Will save time
- Save gardener effort ( Man power)
- Water can be Delivered at optimal levels for plant growth
- Can reduce weeds
- Can protect the soil ecosystem

## XII. FUTURE SCOPE

In future, it can provide high accuracy water supply and avoid water from wastage. Due to automatically handling, user requires less man power. With the help of the sensors, it can accurately determine the soil moisture levels. It can easily detect and control the temperature, humidity, solar radiation using sensors. It will help in gardening. It will also encourage the new generation to towards the planting and gardening process. We can also organisation the balcony garden and maintain it.

## XIII .APPLICATIONS

- Balcony gardening.
- Office plants.
- Small scale farming.
- Public gardening.
- Real time operating system.
- Smart farming and livestock management.



## XI. CONCLUSION

Automatic system using a microcontroller, moisture sensor and other electronic tools were been developed. It was observed that the proposed methodology controls the moisture content of the soil of cultivated land. The motor automatically start pumping water if the soil is dry and need water and stops when the moisture content of the soil is maintained as required.

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